

REMARKS

This paper is being filed in response to the Office Action dated July 10, 2002.

Applicants respectfully request reconsideration of the above-identified application in light of the amendments and remarks presented in the instant Amendment.

Claims 1-9 and 13-30 are pending. Claims 5, 10-12, 14, 23, 26, and 29-30 have been cancelled without prejudice. Claims 1-4, 6-9, 13, 15-22, 24-25, and 27-28 have been amended. New claims 31-35 have been added. Rewritten claims appear in the preceding "IN THE CLAIMS" section. Attached hereto is a marked-up version of the changes made by the instant amendment captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE" and is included pursuant to 37 C.F.R. §1.121(c)(ii). Should any discrepancies be discovered, the version presented in the preceding "IN THE CLAIMS" section shall take precedence.

Amended claims 1-4, 6-9, 13, 15-22, 24-25, and 27-28 are supported by the application as filed at, *inter alia*, page 3, line 26 to page 4, line 5, SEQ ID NO:1, SEQ ID NO:14, and respectively numbered original claims 1-4, 6-9, 13, 15-22, 24-25, and 27-30. Therefore, these amendments do not constitute new matter.

New claims 31-33 and 35 are supported by the application as filed at, *inter alia*, page 3, line 26 to page 4, line 5, SEQ ID NO:1, SEQ ID NO:14, and original claims 25 and 29-30. New claim 34 is supported by the application as filed at, *inter alia*, original claim 26.

As a preliminary matter, Applicants thank the Examiner for acknowledging entry of Applicant's sequence listing, reviewing the documents cited in Applicant's Information Disclosure Statement (Paper No. 6), and providing notice of the Draftsperson's acceptance of Applicant's drawings.

I. Claim Objections

The Examiner has objected to claims 3, 4, and 8 as allegedly either having more than one period or reciting a species name without italics. Applicants assert that these claims, as amended herein, are free of the recited objectionable informalities. Therefore, Applicants respectfully request withdrawal of these objections.

II. Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1-9 and 13-30 have been rejected under 35 U.S.C. §112, second paragraph as indefinite for allegedly failing to particularly point out and distinctly claim the subject matter that the Applicant regards as the invention. The Examiner has alleged that the claims are replete with vague and indefinite terms and has suggested that a careful and complete review of the claims be performed. Applicants have followed this suggestion and assert that the claims, as amended herein, are clear and definite. Applicants, therefore, respectfully request withdrawal of this rejection.

III. Rejections Under 35 U.S.C. § 101

Claims 1-9 and 13-30 have been rejected under 35 U.S.C. §101 as allegedly directed to a non-isolated and naturally occurring nucleic acid fragment. The Examiner has suggested amending "Nucleic acid" in claim 1 to recite "An isolated nucleic acid". The Examiner has further rejected claim 19 as drawn to transformed host organisms which allegedly reads on human organisms. The Examiner has suggested replacing "organism" in claim 19 with "plant" or "host cell". Applicants assert that these claims, as amended herein, are drawn to

statutory subject matter. Therefore, Applicants respectfully request withdrawal of these rejections.

IV. Rejections Under 35 U.S.C. § 112, first paragraph

1. Claims Are Fully Enabled

Claims 1-9 and 13-30 have been rejected under 35 U.S.C. §112, first paragraph as allegedly containing subject matter which was not described in such a way as to enable one skilled in the art to make and/or use the invention. The Examiner has acknowledged that the specification is enabling for the nucleic acid fragment of SEQ ID NO:1, from *Psodius maculiventis*, encoding thanatin with bactericidal or fungicidal properties when expressed in transformed plants and the synthetic sequence of SEQ ID NOS:2 and 5. However, the Examiner has alleged that the specification is not enabling for any nucleic acid fragment from any source encoding thanatin; homologous or complementary sequences of SEQ ID NOS:1, 2, or 5 encoding thanatin; non-plant host organisms or transformation of non-plant host organisms; or a method of transforming plants for bacterial resistance using non-exemplified sequences. The Examiner has also alleged that the specification does not provide any guidance for identifying and obtaining all DNA sequences encoding thanatin. The Examiner has further alleged that the specification does not disclose or provide guidance for a DNA sequence that is capable of rendering a plant resistant to any or all disease.

Applicants traverse this rejection and assert that all pending claims are fully enabled by the specification. Claims 1-9 and 13-30, as amended herein, do not recite homology, but rather recite a specific formula for a thanatin polypeptide as disclosed in the specification at page 3, line 26 to page 4, line 5.

Applicant's disclosure enables one of ordinary skill in the art to make and use a nucleic acid encoding the peptide of Formula I. Applicants have provided several examples of such sequences and assert that any and all others could be derived from published codon usage tables. Applicants assert that it was well within the ability of one of ordinary skill in the art at the time the application was filed to synthesize nucleic acids of Formula I. Therefore, information regarding alternate sources of thanatin, primers to amplify thanatin-encoding sequences, and hybridization conditions is totally unnecessary. Applicants assert that claim 24, which has been amended to recite "at least one disease", is fully supported by the specification as filed. Therefore, Applicants respectfully request withdrawal of these rejections.

2. Claims Are Supported by an Adequate Written Description

Claims 1-9 and 13-30 have been rejected under 35 U.S.C. §112, first paragraph as allegedly containing subject matter that was not described in the specification in such a way as to convey to one of ordinary skill in the art that Applicants had possession of the invention at the time the application was filed. The Examiner alleges that Applicants do not disclose all nucleic acid fragments encoding thanatin or any identifying physical or chemical characteristics, but disclose only SEQ ID NOS:1, 2, and 5.

Applicants traverse this rejection and assert that the claims, as amended herein, are supported by a description that reasonably conveys to the artisan of ordinary skill that Applicants were in possession of the claimed invention at the time the application was filed. Claim 1, as amended herein, recites "a thanatin peptide having the amino acid sequence of Formula I". Applicants assert that the examples provided in, *inter alia*, SEQ ID NOS:1, 2, 5, and 14 and at page 3, line 26 to page 4, line 5 sufficiently describe a genus of nucleic acids that

encode a thanatin peptide having the amino acid sequence of Formula I. Therefore, Applicants respectfully request withdrawal of this rejection.

V. Rejections Under 35 U.S.C. § 103

Claims 1-3 and 7-11 have been rejected under 35 U.S.C. 103(a) as allegedly obvious over EP 0798381 by Mitsuvara et al. (hereinafter "Mitsuvara") in view of Fehlbaum et al., *Proc. Natl. Acad. Sci.* 93:1221-1225 (hereinafter "Fehlbaum"). The Examiner has alleged that Mitsuvara discloses an isolated *Diptera* gene encoding an antibacterial/antifungal peptide, a plasmid and expression vector comprising the gene and regulatory elements including the PR-1a gene, and methods for producing transformed plants resistant to bacteria and fungus. The Examiner has acknowledged that Mitsuvara does not disclose a thanatin DNA or peptide. The Examiner has alleged that Fehlbaum discloses an isolated and purified thanatin from *Psodius macuiventris* having bactericidal and fungicidal activity. The Examiner has concluded that it would have been obvious to one of ordinary skill in the art to produce disease-resistant transformed plants by modifying Mitsuvara using any other antimicrobial peptide such as that of Fehlbaum.

Applicants traverse this rejection and assert that the instant claims are patentable over Mitsuvara and Fehlbaum since these documents fail to teach or suggest a **nucleic acid** encoding a thanatin peptide of Formula I. To maintain an obviousness rejection, the combination of references must teach or suggest each and every element of Applicant's claim. Neither Mitsuvara nor Fehlbaum teach or suggest a nucleic acid that encodes a thanatin peptide having the amino acid sequence of Formula I. At most Fehlbaum appears to teach peptide sequences. However, this is insufficient to establish *prima facie* obviousness. See e.g. *In re Deuel*, 51 F.3d 1552, 1558 (Fed. Cir. 1995)(combination of reference teaching gene cloning with reference

disclosing a partial amino acid sequence of heparin binding growth factor did not render claims to DNA encoding heparin binding growth factor obvious where the redundancy of the genetic code affords an enormous number of possible sequences).

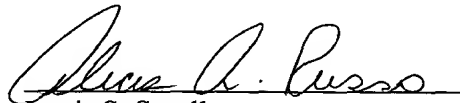
VI. Conclusion

Applicants maintain that in view of the amendments and remarks made herein, the claims are in condition for allowance. A Notice of Allowance is earnestly solicited.

Applicants do not believe any fee is required for this filing. Nevertheless, the Commissioner is hereby authorized to charge any fees required for this submission not otherwise enclosed herewith to Deposit Account No. 02-4377. Two copies of this page are enclosed.

Respectfully submitted,

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Enclosure

VERSION WITH MARKINGS TO SHOW CHANGES MADE

This marked-up version was prepared with DeltaView software (v2.5.163). In this section, added text is marked with double underlining. *e.g.* added text, and deleted text is marked by a single strikethrough, *e.g.* ~~deleted text~~.

IN THE CLAIMS

Claim 1 has been amended as follows:

1. (AMENDED) ~~Nucleic acid fragment, characterized in that it comprises~~An isolated nucleic acid comprising a nucleic acid sequence encoding a thanatin- peptide which comprises the amino acid sequence of Formula I:

(I) Xaa-Ile-Ile-Tyr-Cys-Asn-Arg-Arg-Thr-Gly-Lys-Cys-Xab

in which

Xaa is NH₂ or a variable residue having a sequence from 1 to 10 amino acids, and

Xab is OH or a variable residue having a sequence from 0 to 5 amino acids.

Claim 2 has been amended as follows:

2. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~of claim 1, ~~characterized in that~~

~~it~~wherein the nucleic acid is a ~~DNA-type nucleotide~~
sequence.

Claim 3 has been amended as follows:

3. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~of claim 2, ~~characterized in that~~wherein
~~the DNA-type~~nucleic nucleotideacid sequence ~~comprises~~
is selected from the ~~DNA sequence described by the~~
~~sequence identifier No. 1 (group consisting of SEQ ID~~
~~NO :1), a homologous sequence or a sequence~~
~~complementary to and the said sequence, complement of~~
SEQ ID NO:1.

Claim 4 has been amended as follows:

4. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~of claim 3, ~~characterized in that~~2,
wherein the ~~DNA-type~~nucleic nucleotideacid sequence
~~comprises~~ is selected from the ~~DNA sequence described~~
~~by the sequence identifier No. 2 (group consisting of~~
~~SEQ ID NO :2), a homologous sequence or a sequence~~
~~complementary to and the said sequence, complement of~~
SEQ ID NO:2.

Claim 6 has been amended as follows:

6. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~claim 5, characterized in that the
~~protein is~~further comprising a second nucleic acid
sequence, wherein said second nucleic acid sequence
encodes a signal peptide or a transit peptide and is
operably linked to the first nucleic acid sequence.

Claim 7 has been amended as follows:

7. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~claim 6, characterized in thatwherein
the signal peptide encoded by the second nucleic acid
sequence is the signal peptide~~of~~from the tobacco PR--
la gene.

Claim 8 has been amended as follows:

8. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~claim 7, characterized in that it
~~comprises~~1, wherein the ~~DNA~~nucleic acid sequence
~~described by~~is selected from the sequence identifier
~~No. 5 (group consisting of SEQ ID NO-5), a homologous~~
~~sequence or a sequence complementary to~~5, nucleotides 12

to 164 of SEQ ID NO:5, the said sequence-complement of
SEQ ID NO:5, and the complement nucleotides 12 to 164
of SEQ ID NO:5.

Claim 9 has been amended as follows:

9. (AMENDED) ~~Nucleic~~The isolated nucleic acid fragment
~~according to~~of claim 8, ~~characterized in that it~~
~~comprises~~wherein the coding partnucleic acid sequence
is nucleotides 12 to 164 of SEQ ID NO-5, corresponding
~~to bases 12 to 164.~~5.

Claim 13 has been amended as follows:

13. (AMENDED) ~~Chimeric~~A chimeric gene comprising a
coding sequence ~~as well as~~operably linked to at least
one heterologous regulatory elements ~~at the 5' and 3'~~
~~positions which can function in a host organism, in~~
~~particular plants, characterized in that the~~element,
wherein said coding sequence comprises ~~at least one~~
~~DNA fragment~~a nucleic acid sequence encoding a
~~thanatin as defined in claim 1.~~peptide which comprises
the amino acid sequence of Formula I:

(I) Xaa-Ile-Ile-Tyr-Cys-Asn-Arg-Arg-Thr-Gly-Lys-Cys-Xab

in which

Xaa is NH₂ or a variable residue having a sequence
from 1 to 10 amino acids, and

Xab is OH or a variable residue having a sequence
from 0 to 5 amino acids.

Claim 15 has been amended as follows:

15. (AMENDED) ~~Chimeric~~The chimeric gene ~~according to of~~
claim 13, ~~characterized in that it also~~
~~comprises~~further comprising a selectable marker.

Claim 16 has been amended as follows:

16. (AMENDED) ~~Cloning or~~An expression vector ~~for the~~
~~transformation of a host organism, characterized in~~
~~that it comprises~~comprising at least one replication
origin and ~~at least one~~a chimeric gene ~~as defined~~
which comprises a coding sequence operably linked to
at least one heterologous regulatory element, wherein
said coding sequence comprises a nucleic acid sequence
encoding a thanatin peptide which comprises the amino
acid sequence of Formula I:

(I) Xaa-Ile-Ile-Tyr-Cys-Asn-Arg-Arg-Thr-Gly-Lys-Cys-Xab

in ~~claim 13~~.which

Xaa is NH₂ or a variable residue having a sequence
from 1 to 10 amino acids, and

Xab is OH or a variable residue having a sequence
from 0 to 5 amino acids.

Claim 17 has been amended as follows:

17. (AMENDED) ~~Vector according to~~The expression vector
of claim 16, characterized in that itwherein said
expression vector is a virus used for theviral plant
transformation of developed plants and containing, in
addition, its own elements for replication and
expressionvector.

Claim 18 has been amended as follows:

18. (AMENDED) ~~Vector according to~~The expression vector
of claim 16, characterized in that itwherein said
expression vector is a plasmid.

Claim 19 has been amended as follows:

19. (AMENDED) ~~Transformed host organisms, characterized~~
~~in that they contain an effective quantity of a~~
~~chimeric gene according to claim 13.~~ A transformed host
cell comprising a chimeric gene which comprises a
coding sequence operably linked to at least one
heterologous regulatory element, wherein said coding
sequence comprises a nucleic acid sequence encoding a
thanatin peptide which comprises the amino acid
sequence of Formula I:

(I) Xaa-Ile-Ile-Tyr-Cys-Asn-Arg-Arg-Thr-Gly-Lys-Cys-Xab

in which

Xaa is NH₂ or a variable residue having a sequence
from 1 to 10 amino acids, and

Xab is OH or a variable residue having a sequence
from 0 to 5 amino acids.

Claim 20 has been amended as follows:

20. (AMENDED) ~~Transformed~~ The transformed host organism
~~according to~~ cell of claim 19, ~~characterized in that it~~

~~consists of~~wherein the transformed host cell is a
~~plant cells or plants~~cell.

Claim 21 has been amended as follows:

21. (AMENDED) ~~Transformed host organism according to~~
~~claim 20, characterized in that it is a~~ plant
~~containing~~comprising at least one transformed
~~cells.~~host cell of claim 20.

Claim 22 has been amended as follows:

22. (AMENDED) ~~Host organism according to~~The plant of
~~claim 21, characterized in that~~wherein substantially
all of the cells of the plant is regenerated from
~~transformed host cells.~~of claim 20.

Claim 24 has been amended as follows:

24. (AMENDED) ~~Transformed~~The plant of claim 22, wherein
the plant is resistant to diseases, ~~characterized in~~
~~that it comprises~~ at least one transformed plant cell
~~according to claim 23.~~disease.

Claim 25 has been amended as follows:

25. (AMENDED) ~~Transformed~~The disease-resistant plant
~~according to~~of claim 24, ~~characterized in that~~
~~it~~wherein said disease ~~is resistant to diseases~~ caused
by at least one microorganism selected from the group
consisting of Cercospora, in particular Cercospora
~~beticola~~Cladosporium, CladosporiumFusarium, in
~~particular Cladosporium herbarum, Fusarium, in~~
~~particular Fusarium culmorum or Fusarium graminearum~~
~~or by and~~ Phytophthora, in particular Phytophthora
cinnamomi.

Claim 27 has been amended as follows:

27. (AMENDED) ~~Seeds~~A seed of the transformed plants
~~according to~~plant of claim 24. ~~24, wherein the seed~~
retains the nucleic acid.

Claim 28 has been amended as follows:

28. (AMENDED) ~~Method~~A method of transforming a cell of a
host organism comprising contacting the cell of the
~~host organisms, in particular plant cells or plants,~~
~~characterized in that~~organism with a chimeric gene

which comprises a coding sequence operably linked to
at least one heterologous regulatory element, wherein
said coding sequence comprises a nucleic acid fragment
according to claim 1 is inserted into the said host
organism. sequence encoding a thanatin peptide which
comprises the amino acid sequence of Formula I:

(I) Xaa-Ile-Ile-Tyr-Cys-Asn-Arg-Arg-Thr-Gly-Lys-Cys-Xab

in which

Xaa is NH₂ or a variable residue having a sequence
from 1 to 10 amino acids, and

Xab is OH or a variable residue having a sequence from
0 to 5 amino acids.

under conditions that permit said cell to take up said
chimeric gene.